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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/663,564	09/15/2000	Gregory L. Slaughter	5181-47200	3521

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EXAMINER

HOANG, PHUONG N

ART UNIT PAPER NUMBER

2126

DATE MAILED: 07/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/663,564	Applicant(s) SLAUGHTER ET AL.	
	Examiner Phuong N. Hoang	Art Unit 2126	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 66 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 66 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1 – 66 are presented for examination.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1 – 7, 10, 11, 13, 14, 16, 17, 19 – 21, 24, 25, 27 – 29, 33 – 39, 44 – 46, 48, 49, 51 - 55, 58, 59, 61 – 63, and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckle, UK patent no. 2,332,288 A in view of Jagannathan, US patent no. 6,496,871.**

4. Buckle and Jagannathan references were cited in the last office action.

5. **As to claim 1**, Buckle teaches a method for representing a state of a process in a data representation language in a distributed computing environment, the method comprising the steps of:

- a. executing the process within a first device (inherent when transporting the agent from L1)
- b. converting a current state process into a data representation language representation of the current process (record object and object states (ie an agent) as a stream of data ACL message string, page 38);
- c. storing the data representation language representation of the current computation process (the agent code in the form of ACL message is stored, page 39 lines 1 - 10);
- d. wherein the data representation language representation of the current computation state of the process is configured for use in reconstituting (re-constructing the byte stream back into an object resident, page 38 lines 30 – page 39 lines 5) the process and resuming execution of the process (continue execution, page 38 lines 10 – 20).

However, Buckle does not explicitly teach wherein the computation state of the process comprises information about the execution state of the process.

Jagannathan teaches wherein the process comprises information about the execution (process execution, col. 6 lines 40 – 45) of the process.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Buckle and Jagannathan's system because Jagannathan's execution state of the process would be necessary during the migration of agents when the state of the process are converting into a format to communicate with the destination location.

6. **As to claim 2**, Buckle teaches the steps of wherein the data representation language representation of the current computation state of the process is stored to a space using a space service (space used to store agent code of arrived stream, page 39 lines 1 - 10) wherein the space is operable to store documents including data representation language documents in the distributed computing environment, and wherein the space service is operable to store and retrieve documents to the space for processes in the distributed computing environment (agent can operate the stream content in ACL message, page 39 lines 1 - 10).

7. **As to claims 3 and 4**, Buckle teaches the steps of wherein said storing the data representation language representation of the current computation state of the process comprises sending (transported, page 38 lines 15 - 20) the data representation language representation to the space service in one or more messages (stored locally at the location L2, page 39 lines 1 - 10).

8. **As to claim 5**, Buckle teaches

- a. a second device (remote host, page 38 lines 10 - 20) accessing the stored data representation language representation of the current computation state of the process (the content is decoded and operated at remote host, page 38 lines 15 - page 39 line 10);

b. reconstituting (re-constructing the byte stream back into an object resident in remote host, page 38 lines 30 – page 39 lines 5) the process at the current computation state within the second device from the data representation language representation of the current computation state of the process; and

c. resuming execution of the process within the second device from the current computation state (continue execution at remote host, page 38 lines 10 – 20).

9. **As to claims 6 and 7**, see the rejection for claim 2 above. Further, Buckle teaches wherein said accessing the data representation language representation of the current computation state of the process comprises receiving, the data representation language representation from the space service in one or more messages (ACL message is received at location L2, page 39 lines 1 - 10).

10. **As to claim 10**, Buckle teaches

a. the first device accessing the stored data representation language representation of the current computation state of the process from the space service (L1 transported agent to L2 residing on a single machine, p. 15 lines 20 – 29, and page 38 lines 5 – page 39 lines 10);

b. reconstituting (re-constructing the byte stream back into an object resident residing on a single machine, p. 15 lines 20 – 29, and page 38 lines 30 – page 39 lines 5) the process at the current computation state within the first device from the data representation language representation of the current computation state of the process;

c. ending execution of the process within the first device (ending when message is transferred), resuming execution of the process within the first device from the current computation state (continue execution at L2 residing on a single machine, p. 15 lines 20 – 29 and p. 38 lines 10 – 20).

11. **As to claim 11**, Buckle modified by Jagannathan teaches the steps of wherein the current computation state of the process includes one or more threads of the process, and wherein said converting a current computation state of the process into a data representation language representation of the current computation state comprises:

including information describing the one or more threads (Jagannathan; threads, col. 11 lines 7 – 20 and col. 12 lines 28 – 35) in the data representation language representation of the current computation state, wherein the information describing the one or more threads is configured for use in restarting the one or more threads (it is obvious that the threads restart when the process resume execution) when resuming execution of the process.

12. **As to claim 13**, Buckle teaches the steps of wherein the current computation state of the process includes one or more objects of the process, wherein an object is an instance of a class in a computer programming language, and wherein said converting a current computation state of the process into a data representation language representation of the current computation state comprises:

- a. converting the one or more objects (record object and object states (ie an agent) as a stream of data, page 38 lines 10 – 20) into data representation language representations of the one or more objects;
- b. including the data representation language representations of the one or more objects in the data representation language representation of the current computation state of the process (packing up agent and its state into the content parameter of an ACL message, page 38 lines 12 – 15);
- c. wherein the data representation language representations of the one or more objects are configured for use in generating copies of the one or more objects (objects can be recovered back into object resident in remote host, p. 39).

13. **As to claim 14**, Buckle teaches the step of wherein the computer programming language is the Java programming language (Java, page 2 lines 25 - 30).

14. **As to claims 16 and 17**, Buckle modified by Jagannathan teaches the step of wherein the process is executing within a virtual machine (Java virtual machine, col. 2 lines 55 – 65) executing within the first device.

15. **As to claim 19**, Buckle teaches a method for representing a state of a process in a data representation language in a distributed computing environment, the method comprising the steps of:

executing the process within a first device (inherent when transporting the agent from L1)

converting a current state process into a data representation language representation of the current process (record object and object states (ie an agent) as a stream of data ACL message string, page 38);

sending the data representation language to a second device (the ACL message is transported to a second location L2 on a remote host, page 38).

reconstituting (re-constructing the byte stream back into an object resident in remote host, page 38 lines 30 – page 39 lines 5) the process at the current computation state within the second device from the data representation language representation of the current computation state of the process; and

resuming execution of the process within the second device from the current computation state (continue execution at remote host, page 38 lines 10 – 20).

However, Buckle does not explicitly teach wherein the computation state of the process comprises information about the execution state of the process.

Jagannathan teaches wherein the process comprises information about the execution (process execution, col. 6 lines 40 – 45) of the process.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Buckle and Jagannathan's system because Jagannathan's execution state of the process would be necessary during the migration of agents when the state of the process are converting into a format to communicate with the destination location.

16. **As to claims 20 and 21**, Buckle modified by Jagannathan teaches the steps of wherein said sending the data representation language representation of the current computation state of the process to a second device comprises sending the data representation language representation in one or more messages to the second device (send ACL message to remote host, page 38).

17. **As to claims 24 and 25**, see claims 16 and 17 above.

18. **As to claim 27**, Buckle teaches the steps of:

- a. a first device (host which sends agent, page 38) operable to execute the process;
- b. a second device (remote host, page 38) comprising:
 - a space operable to store documents including data representation language documents in the distributed computing system (space to store the ACL message at the location L2, page 39 lines 1 – 10);
 - a space service operable to store and retrieve documents to the space for processes in the distributed computing environment (agent can operate at location L2, page 39 lines 1 – 10);
- c. wherein the first device is configured to:

. convert a current computation state of the process into a data representation language representation of the current computation state (record object and object states (ie an agent) as a stream of data, page 38);

. send the data representation language representation of the current computation state of the process to the space service (the ACL message is transported to and stored at second location L2, page 38 and 39);

d. wherein the space service is operable to store the data representation language representation of the current computation state of the process to the space (the ACL message is stored at the location L2, page 39 lines 1 – 10), and wherein the data representation language representation of the current computation state of the process is configured for use in reconstituting the process (re-constructing the byte stream back into an object resident, page 38 lines 30 – page 39 lines 5) and resume execution of the process (continue execution, page 38 lines 10 – 20).

However, Buckle does not explicitly teach wherein the process comprises information about the execution state of the process within the first device.

Jagannathan teaches wherein the process comprises information about the execution state (process execution, col. 6 lines 40 – 45) of the process.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Buckle and Jagannathan because Jagannathan's state process would be necessary for converting into a standard format to communicate with the destination process in the migration of agents.

19. **As to claims 28 and 29**, see rejection for claims 6 and 7.
20. **As to claim 33**, see rejection for claim 19 above. This is the reserve process that the first device at L1 location is able to receive and re-instructing the ACL message as being processed at location L2 as being processed at L2.
21. **As to claim 34 - 37**, see rejection for rejection of claim 11 - 14 above respectively.
22. **As to claim 38 - 39**, see rejection for rejection of claim 16 - 17 above respectively.
23. **As to claim 44**, it is the system claim of claim 19. See rejection for claim 19.
24. **As to claims 45 and 56**, see rejection for claims 20 and 21 above.
25. **As to claims 48 and 49**, see rejection for claims 24 and 25 above.
26. **As to claim 51**, it is the software claim of claim 1. See rejection for claim 1 above.
27. **As to claims 52 and 53**, see rejection for claims 2 and 3 above.
28. **As to claims 54 and 55**, see rejection for claims 5 and 6 above.

29. **As to claims 58**, see rejection for claim 10 above.
30. **As to claim 59**, see rejection for claim 16 above.
31. **As to claim 61**, it is the software claim of claim 19. See rejection for claim 19 above.
32. **As to claims 62 and 63**, see rejection for claims 20 and 21 above.
33. **As to claim 65**, see rejection for claim 24 above.
34. **Claims 8, 9, 41 – 43, 56, and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckle, UK patent no. 2,332,288 A in view of Jagannathan, US patent no. 6,496,871, and further in view of Graham, US patent no. 6,594,700.**
35. Graham was cited in the last office action.
36. **As to claims 8, 9, 56, and 57**, Buckle and Jagannathan do not teach
- a. generating an advertisement for the data representation language representation, wherein the advertisement comprises information to enable access to

the stored data representation language representation, and wherein the second device accessing the stored data representation language representation comprises:

b. the second device accessing the advertisement for the stored data representation language representation;

c. the second device locating the stored data representation language representation using the information in the advertisement.

Graham teaches:

a. generating an advertisement (convert the incoming protocol-specific data into the canonical form for service advertising in the registry, col. 6 lines 1 – 67) for the data representation language representation, wherein the advertisement comprises information to enable access to the stored data representation language representation (advertisement are stored within internal registry, col. 6 lines 50 – col. 7 lines 20), and wherein the second device accessing the stored data representation language representation comprises:

b. the second device accessing the advertisement for the stored data representation language representation (service provider uses advertisement to look up for client requests, col. 6 - 7);

c. the second device locating the stored data representation language representation using the information in the advertisement (service provider uses advertisement to look up for client requests, col. 6 - 7).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Buckle and Jagannathan and Graham's

system because the Graham's service advertisement provide a unique protocol to maximize the number of clients that can utilize the services.

37. **As to claim 41**, it is the system claim of claim 1. See rejection for claim 1 above. Buckle and Jagannathan do not teach generating an advertisement for the data representation language representation, wherein the advertisement comprises information to enable access to the stored data representation language representation, and wherein the second device accessing the stored data representation language representation.

Graham teaches generating an advertisement (convert the incoming protocol-specific data into the canonical form for service advertising in the registry, col. 6 lines 1 – 67) for the data representation language representation, wherein the advertisement comprises information to enable access to the stored data representation language representation (advertisement are stored within internal registry, col. 6 lines 50 – col. 7 lines 20), and wherein the second device accessing the stored data representation language representation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Buckle and Jagannathan and Graham's system because the Graham's service advertisement provide a unique protocol to maximize the number of clients that can utilize the services.

38. **As to claim 42**, Buckle teaches the steps of:

- a. a second device (remote host, page 38) comprising:
 - a space operable to store documents including data representation language documents in the distributed computing system (space to store the ACL message at the location L2, page 39 lines 1 – 10);
 - a space service operable to store and retrieve documents to the space for processes in the distributed computing environment (agent can operate at location L2, page 39 lines 1 – 10);
- b. wherein the first device is further configured to send the advertisement for the stored data representation language representation to the space service (clients 410, 412 and 416 may requestcanonical representation, col. 6 lines 65 – col. 7 lines 40).
- c. wherein the space service is configured to store the advertisement for the stored data representation language representation to the space (advertisement are stored within internal registry, col. 6 lines 50 – col. 7 lines 20).

39. **As to claim 43**, see rejection for claim 30 above.

40. **Claims 12, 15, 22, 23, 47, and 64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckle, UK patent no. 2,332,288 A in view of Jagannathan, US patent no. 6,496,871, and further in view of Edward "Core Jini" pages 405 – 410.**

41. Edward was cited in the last office action.

42. **As to claim 12**, Buckle and Jagannathan do not teach the steps of wherein the current computation state of the process includes one or more leases to services held the process, and wherein the converting a current computation state of the process into a data representation language representation of the current computation state comprises:

including information describing the one or more leases in the data representation language representation of the current computation state, wherein the information describing the one or more leases is configured for use in reestablishing the one or more leases to services for the process when resuming execution of the process.

Edward teaches including information describing the one or more leases (leases, pages 405 – 410), wherein the information describing the one or more leases is configured for use in reestablishing the one or more leases to services (renewing a lease) for the process when resuming execution of the process.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Buckle and Jagannathan and Edward's system because Edward's lease is the data necessary to know how long the data available for accessing the resources.

43. **As to claims 15, 47, and 64**, see rejection for claims 12 and 13 above.

44. **As to claims 22 and 23**, see rejection for claim 15 above.

45. **Claims 18, 26, 40, 50, 60, and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckle, UK patent no. 2,332,288 A in view of Jagannathan, US patent no. 6,496,871, and further in view of Emmerich "Incremental Code Mobility with XML" p. 1 – 10.**

46. Emmerich was cited in the last office action.

47. **As to claims 18, 26, 40, 50, 60, and 66**, Buckle and Jagannathan do not teach the data representation language is XML.

Emmerich teaches XML is used for transferred on a network (XML; page 2 col. 2 – page 3 col. 2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teaching of Buckle and Jagannathan and Emmerich's system because Emmerich's XML is well-known as a flexible format to share on the World Wide Web, intranets, and elsewhere.

48. Claims 30 – 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buckle, UK patent no. 2,332,288 A in view of Jagannathan, US patent no. 6,496,871, and further in view of the “Official Notice”.

49. As to claim 30, Buckle and Jagannathan do not explicitly teach a third device. However, Buckle teaches the collection of agents may be transported across a plurality of physical resources, through the CORBA platform (abstract).

The “Official Notice” was taken to modify the Buckle’s and Jagannathan’s system to use of a plurality of physical resources to be a third device because it would more connections for a large network.

50. As to claim 31 and 32, see rejection for claims 28 and 29 above.

Response to Arguments

51. Applicant's arguments filed on 05/06/04 have been fully considered but they are not persuasive.

52. Applicant argued in substance that

(1) Buckle does not teach converting a current computation state of a process into a data representation language representation of the current computation

state and storing the data representation language representation of the current computation state of the process.

(2) Jagannathan does not teach converting a current computation state of a process into a data representation language representation of the current computation state and storing the data representation language representation of the current computation state of the process.

(3) There is no motivation to combine Buckle and Jagannathan references.

(4) Buckle does not teach converting a current computation state of a process into a data representation language representation of the current computation state and sending the data representation language representation of the current computation state of the process to a second device.

(5) Buckle does not teach converting a current computation state of a process into a data representation language representation of the current computation state and sending the data representation language representation of the current computation state of the process to a space service for storage.

(6) There is no motivation to combine Buckle, Jagannathan, and Graham references.

(7) The "Office Notice" was taken improperly.

53. In response,

As to point 1, Buckle teaches converting a current computation state of a process into a data representation language representation of the current computation state and storing the data representation language representation of the current computation state of the process. when the code including object and object states is packed into the content parameter of an ACL message string, the code including all object states was converted (page 38) to ACL message. The ACL message is stored when it was sent to the location L2 (page 39 lines 1 – 15).

As to point 2, Examiner does not cite Jagannathan for teaching the steps of converting a current computation state of a process into a data representation language representation of the current computation state and storing the data representation language representation of the current computation state of the process. Buckle was cited for teaching the limitations as argued in point 1.

As to point 3, both Buckle and Jagannathan teach the migration of agents or mobile agents, so they are analog art and can be combined.

As to point 4, Buckle teaches converting a current computation state of a process into a data representation language representation of the current computation state (object and object states is packed into the content parameter of an ACL message string, page 38) and sending the data representation language to a second device (the ACL message is transported to a second location L2 on a remote host, page 38).

As to point 5, Buckle teaches converting a current computation state of a process into a data representation language representation of the current computation state (object and object states is packed into the content parameter of an ACL message string, page 38) and sending the data representation language to a space service for storage (the ACL message is sent to and stored at second location L2, page 38 and 39);

As to point 6, Buckle and Jagannathan teaches the migration of agents or mobile agents, and Graham teaches the code mobility can be achieved with mobile agents (page 1) so they are analog art and can be combined.

As to point 7, the "Official Notice" was re-written properly.

Conclusion

54. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


55. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong N. Hoang whose telephone number is (703) 605-4239. The examiner can normally be reached on Monday - Friday 9:00 am to 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (703)305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ph

July 12, 2004


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